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PCT/EP99/05467

SEQUENZPROTOKOLL

JC07 Rec'd PCT/PTO 01 FEB 2001

<110> SunGene GmbH & Co. KGaA

<120> DNA-Sequenz kodierend fuer eine
1-Deoxy-D-xylulose-5-phosphat Synthase

<130> 0050/49249

<140> 0817 - 00006

<141> 1999-08-04

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<170> PatentIn Vers. 2.0

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<213> Arabidopsis thaliana

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<222> (1)..(2154)

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Gly Leu Ser Thr Asp Ser Cys Lys Ser Thr Ser Leu Ser Ser Ser Arg
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tct ttg gtt aca gat ctt cca tca cca tgt ctg aaa ccc aac aac aat 144
Ser Leu Val Thr Asp Leu Pro Ser Pro Cys Leu Lys Pro Asn Asn Asn
35 40 45

tcc cat tca aac aga aga gca aaa gtg tgt gct tca ctt gca gag aag 192
Ser His Ser Asn Arg Arg Ala Lys Val Cys Ala Ser Leu Ala Glu Lys
50 55 60

ggg gaa tat tat tca aac aga cca cca act cca tta ctt gac act att 240
Gly Glu Tyr Tyr Ser Asn Arg Pro Pro Thr Pro Leu Leu Asp Thr Ile
65 70 75 80

aac tac cca atc cac atg aaa aat ctt tct gtc aag gaa ctg aaa caa 288
Asn Tyr Pro Ile His Met Lys Asn Leu Ser Val Lys Glu Leu Lys Gln

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ctt tct gat gag ctg aga tca gac gtg atc ttt aat gtg tcg aaa acc		336
Leu Ser Asp Glu Leu Arg Ser Asp Val Ile Phe Asn Val Ser Lys Thr		
100	105	110
ggt gga cat ttg ggg tca agt ctt ggt gtt gtg gag ctt act gtg gct		384
Gly Gly His Leu Gly Ser Ser Leu Gly Val Val Glu Leu Thr Val Ala		
115	120	125
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Leu His Tyr Ile Phe Asn Thr Pro Gln Asp Lys Ile Leu Trp Asp Val		
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Gly His Gln Ser Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Gly Lys		
145	150	155
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Met Pro Thr Met Arg Gln Thr Asn Gly Leu Ser Gly Phe Thr Lys Arg		
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gga gag agt gaa cat gat tgc ttt ggt act gga cac agc tca acc aca		576
Gly Glu Ser Glu His Asp Cys Phe Gly Thr Gly His Ser Ser Thr Thr		
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Ile Ser Ala Gly Leu Gly Met Ala Val Gly Arg Asp Leu Lys Gly Lys		
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Asn Asn Asn Val Val Ala Val Ile Gly Asp Gly Ala Met Thr Ala Gly		
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Gln Ala Tyr Glu Ala Met Asn Asn Ala Gly Tyr Leu Asp Ser Asp Met		
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Ile Val Ile Leu Asn Asp Asn Lys Gln Val Ser Leu Pro Thr Ala Thr		
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Leu Asp Gly Pro Ser Pro Val Gly Ala Leu Ser Ser Ala Leu Ser		
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Arg Leu Gln Ser Asn Pro Ala Leu Arg Glu Leu Arg Glu Val Ala Lys		

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gta gat gtg tat gct cga gga atg ata agc ggt act gga tcg tca ctg 960
 Val Asp Val Tyr Ala Arg Gly Met Ile Ser Gly Thr Gly Ser Ser Leu
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 Phe Glu Glu Leu Gly Leu Tyr Tyr Ile Gly Pro Val Asp Gly His Asn
 325 330 335

ata gat gat ttg gta gcc att ctt aaa gaa gtt aag agt acc aga acc 1056
 Ile Asp Asp Leu Val Ala Ile Leu Lys Glu Val Lys Ser Thr Arg Thr
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aca gga cct gta ctt att cat gtg gtg acg gag aaa ggt cgt ggt tat 1104
 Thr Gly Pro Val Leu Ile His Val Val Thr Glu Lys Gly Arg Gly Tyr
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 Pro Tyr Ala Glu Arg Ala Asp Asp Lys Tyr His Gly Val Val Lys Phe
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 Asp Pro Ala Thr Gly Arg Gln Phe Lys Thr Thr Asn Glu Thr Gln Ser
 385 390 395 400

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 Tyr Thr Tyr Phe Ala Glu Ala Leu Val Ala Glu Ala Glu Val Asp
 405 410 415

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 Lys Asp Val Val Ala Ile His Ala Ala Met Gly Gly Thr Gly Leu
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aat ctc ttt caa cgt cgc ttc cca aca aga tgt ttc gat gta gga ata 1344
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gcg gaa caa cac gca gtt act ttt gct gcg ggt tta gcc tgt gaa ggc 1392
 Ala Glu Gln His Ala Val Thr Phe Ala Ala Gly Leu Ala Cys Glu Gly
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485	490	495		
gca atg gat aga gct gga ctc gtt gga gct gat ggt ccg aca cat tgt Ala Met Asp Arg Ala Gly Leu Val Gly Ala Asp Gly Pro Thr His Cys				1536
500	505	510		
gga gct ttc gat gtg aca ttt atg gct tgt ctt cct aac atg ata gtg Gly Ala Phe Asp Val Thr Phe Met Ala Cys Leu Pro Asn Met Ile Val				1584
515	520	525		
atg gct cca tca gat gaa gca gat ctc ttt aac atg gtt gca act gct Met Ala Pro Ser Asp Glu Ala Asp Leu Phe Asn Met Val Ala Thr Ala				1632
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565	570	575		
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625	630	635	640	
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660

665

670

aga cca atg gta ctg cct gat cga tac att gat cac ggt gca cca gct 2064
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675 680 685

gat caa cta gct gaa gct gga ctc atg cca tct cac atc gca gca acc 2112
Asp Gln Leu Ala Glu Ala Gly Leu Met Pro Ser His Ile Ala Ala Thr
690 695 700

gca ctt aac tta atc ggt gca cca agg gaa gct ctg ttt tga 2154
Ala Leu Asn Leu Ile Gly Ala Pro Arg Glu Ala Leu Phe
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Gly Glu Tyr Tyr Ser Asn Arg Pro Pro Thr Pro Leu Leu Asp Thr Ile
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Leu Ser Asp Glu Leu Arg Ser Asp Val Ile Phe Asn Val Ser Lys Thr
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Gly Gly His Leu Gly Ser Ser Leu Gly Val Val Glu Leu Thr Val Ala
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Leu His Tyr Ile Phe Asn Thr Pro Gln Asp Lys Ile Leu Trp Asp Val
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Ile Ser Ala Gly Leu Gly Met Ala Val Gly Arg Asp Leu Lys Gly Lys
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260 265 270

Arg Leu Gln Ser Asn Pro Ala Leu Arg Glu Leu Arg Glu Val Ala Lys
275 280 285

Gly Met Thr Lys Gln Ile Gly Gly Pro Met His Gln Leu Ala Ala Lys
290 295 300

Val Asp Val Tyr Ala Arg Gly Met Ile Ser Gly Thr Gly Ser Ser Leu
305 310 315 320

Phe Glu Glu Leu Gly Leu Tyr Tyr Ile Gly Pro Val Asp Gly His Asn
325 330 335

Ile Asp Asp Leu Val Ala Ile Leu Lys Glu Val Lys Ser Thr Arg Thr
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Thr Gly Pro Val Leu Ile His Val Val Thr Glu Lys Gly Arg Gly Tyr
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370 375 380

Asp Pro Ala Thr Gly Arg Gln Phe Lys Thr Thr Asn Glu Thr Gln Ser
385 390 395 400

Tyr Thr Thr Tyr Phe Ala Glu Ala Leu Val Ala Glu Ala Glu Val Asp
405 410 415

Lys Asp Val Val Ala Ile His Ala Ala Met Gly Gly Thr Gly Leu
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Asn Leu Phe Gln Arg Arg Phe Pro Thr Arg Cys Phe Asp Val Gly Ile
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Ala Glu Gln His Ala Val Thr Phe Ala Ala Gly Leu Ala Cys Glu Gly
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Asp Gln Val Val His Asp Val Asp Leu Gln Lys Leu Pro Val Arg Phe
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Gly Ala Phe Asp Val Thr Phe Met Ala Cys Leu Pro Asn Met Ile Val
515 520 525

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530 535 540

Val Ala Ile Asp Asp Arg Pro Ser Cys Phe Arg Tyr Pro Arg Gly Asn
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565 570 575

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580 585 590

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595 600 605

Glu Glu Arg Gly Leu Asn Val Thr Val Ala Asp Ala Arg Phe Cys Lys
610 615 620

Pro Leu Asp Arg Ala Leu Ile Arg Ser Leu Ala Lys Ser His Glu Val
625 630 635 640

Leu Ile Thr Val Glu Glu Gly Ser Ile Gly Gly Phe Gly Ser His Val
645 650 655

Val Gln Phe Leu Ala Leu Asp Gly Leu Leu Asp Gly Lys Leu Lys Trp
660 665 670

Arg Pro Met Val Leu Pro Asp Arg Tyr Ile Asp His Gly Ala Pro Ala
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cag gct tat ccg cat aaa att ttg acc gga cgc cgc gac aaa atc ggc 288			
Gln Ala Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Lys Ile Gly			
85	90	95	
acc atc cgt cag aaa ggc ggt ctg cac ccg ttc ccg tgg cgc ggc gaa 336			
Thr Ile Arg Gln Lys Gly Leu His Pro Phe Pro Trp Arg Gly Glu			
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Ser Glu Tyr Asp Val Leu Ser Val Gly His Ser Ser Thr Ser Ile Ser			
115	120	125	
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Arg Thr Val Cys Val Ile Gly Asp Gly Ala Ile Thr Ala Gly Met Ala			
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Phe Glu Ala Met Asn His Ala Gly Asp Ile Arg Pro Asp Met Leu Val			
165	170	175	
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Ile Leu Asn Asp Asn Glu Met Ser Ile Ser Glu Asn Val Gly Ala Leu			
180	185	190	
aac aac cat ctg gca cag ctg ctt tcc ggt aag ctt tac tct tca ctg 624			
Asn Asn His Leu Ala Gln Leu Leu Ser Gly Lys Leu Tyr Ser Ser Leu			
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210	215	220	
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225	230	235	240
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Thr Leu Phe Glu Glu Leu Gly Phe Asn Tyr Ile Gly Pro Val Asp Gly
 245 250 255

cac gat gtg ctg ggg ctt atc acc acg cta aag aac atg cgc gac ctg 816
 His Asp Val Leu Gly Leu Ile Thr Thr Leu Lys Asn Met Arg Asp Leu
 260 265 270

aaa ggc ccg cag ttc ctg cat atc atg acc aaa aaa ggt cgt ggt tat 864
 Lys Gly Pro Gln Phe Leu His Ile Met Thr Lys Lys Gly Arg Gly Tyr
 275 280 285

gaa ccg gca gaa aaa gac ccg atc act ttc cac gcc gtg cct aaa ttt 912
 Glu Pro Ala Glu Lys Asp Pro Ile Thr Phe His Ala Val Pro Lys Phe
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gat ccc tcc agc ggt tgt ttg ccg aaa agt agc ggc ggt ttg ccg agc 960
 Asp Pro Ser Ser Gly Cys Leu Pro Lys Ser Ser Gly Gly Leu Pro Ser
 305 310 315 320

tat tca aaa atc ttt ggc gac tgg ttg tgc gaa acg gca gcg aaa gac 1008
 Tyr Ser Lys Ile Phe Gly Asp Trp Leu Cys Glu Thr Ala Ala Lys Asp
 325 330 335

aac aag ctg atg gcg att act ccg gcg atg cgt gaa ggt tcc ggc atg 1056
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 340 345 350

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 Val Glu Phe Ser Arg Lys Phe Pro Asp Arg Tyr Phe Asp Val Ala Ile
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 385 390 395 400

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 Tyr His Tyr Asn Asp Gly Pro Ser Ala Val Arg Tyr Pro Arg Gly Asn
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ggc att gtg aag cgt cgt ggc gag aaa ctg gcg atc ctt aac ttt ggt 1536
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 Glu Met Ala Ala Ser His Glu Ala Leu Val Thr Val Glu Glu Asn Ala
 545 550 555 560

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 565 570 575

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 580 585 590

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 Pro Gln Gly Thr Gln Glu Glu Met Arg Ala Glu Leu Gly Leu Asp Ala
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His Phe Ala Ser Gly Leu Gly Thr Val Glu Leu Thr Val Ala Leu His
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Tyr Val Tyr Asn Thr Pro Phe Asp Gln Leu Ile Trp Asp Val Gly His
65 70 75 80

Gln Ala Tyr Pro His Lys Ile Leu Thr Gly Arg Arg Asp Lys Ile Gly
85 90 95

Thr Ile Arg Gln Lys Gly Leu His Pro Phe Pro Trp Arg Gly Glu
100 105 110

Ser Glu Tyr Asp Val Leu Ser Val Gly His Ser Ser Thr Ser Ile Ser
115 120 125

Ala Gly Ile Gly Ile Ala Val Ala Ala Glu Lys Glu Gly Lys Asn Arg
130 135 140

Arg Thr Val Cys Val Ile Gly Asp Gly Ala Ile Thr Ala Gly Met Ala
145 150 155 160

Phe Glu Ala Met Asn His Ala Gly Asp Ile Arg Pro Asp Met Leu Val
165 170 175

Ile Leu Asn Asp Asn Glu Met Ser Ile Ser Glu Asn Val Gly Ala Leu
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Asn Asn His Leu Ala Gln Leu Leu Ser Gly Lys Leu Tyr Ser Ser Leu
195 200 205

Arg Glu Gly Gly Lys Lys Val Phe Ser Gly Val Pro Pro Ile Lys Glu
210 215 220

Leu Leu Lys Arg Thr Glu Glu His Ile Lys Gly Met Val Val Pro Gly
225 230 235 240

Thr Leu Phe Glu Glu Leu Gly Phe Asn Tyr Ile Gly Pro Val Asp Gly
245 250 255

His Asp Val Leu Gly Leu Ile Thr Thr Leu Lys Asn Met Arg Asp Leu
260 265 270

Lys Gly Pro Gln Phe Leu His Ile Met Thr Lys Lys Gly Arg Gly Tyr
275 280 285

Glu Pro Ala Glu Lys Asp Pro Ile Thr Phe His Ala Val Pro Lys Phe
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Asp Pro Ser Ser Gly Cys Leu Pro Lys Ser Ser Gly Gly Leu Pro Ser
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Tyr Ser Lys Ile Phe Gly Asp Trp Leu Cys Glu Thr Ala Ala Lys Asp
325 330 335

Asn Lys Leu Met Ala Ile Thr Pro Ala Met Arg Glu Gly Ser Gly Met
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Val Glu Phe Ser Arg Lys Phe Pro Asp Arg Tyr Phe Asp Val Ala Ile
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Ala Glu Gln His Ala Val Thr Phe Ala Ala Gly Leu Ala Ile Gly Gly
370 375 380

Tyr Lys Pro Ile Val Ala Ile Tyr Ser Thr Phe Leu Gln Arg Ala Tyr
385 390 395 400

Asp Gln Val Leu His Asp Val Ala Ile Gln Lys Leu Pro Val Leu Phe
405 410 415

Ala Ile Asp Arg Ala Gly Ile Val Gly Ala Asp Gly Gln Thr His Gln
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Gly Ala Phe Asp Leu Ser Tyr Leu Arg Cys Ile Pro Glu Met Val Ile
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Met Thr Pro Ser Asp Glu Asn Glu Cys Arg Gln Met Leu Tyr Thr Gly
450 455 460

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465 470 475 480

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485 490 495

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Thr Leu Met Pro Glu Ala Ala Lys Val Ala Glu Ser Leu Asn Ala Thr
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Glu Met Ala Ala Ser His Glu Ala Leu Val Thr Val Glu Glu Asn Ala
545 550 555 560

Ile Met Gly Gly Ala Gly Ser Gly Val Asn Glu Val Leu Met Ala His
565 570 575

Arg Lys Pro Val Pro Val Leu Asn Ile Gly Leu Pro Asp Phe Phe Ile
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gagcaactccg atgcgcggct cccgcgcctc cagcaccagg agccggccgt ccagatgatc 180

gatcgccacg gcagccccctc cagtggtcat cctgtac atg cag ccc cac gcc atg 235
Met Gln Pro His Ala Met

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Gly Gly Ala Leu Asn Thr Leu Ser Ser Gly Gln Ala Asn Tyr Cys Ala	
10 15 20	
cct tgc gga acg gag cga ccc tgc cgc cat gac gca gac cac aca cca	331
Pro Cys Gly Thr Glu Arg Pro Cys Arg His Asp Ala Asp His Thr Pro	
25 30 35	
cac tcc cga cac cgc ccg gca ggc cga ccc ctt ccc ggt gaa ggg aat	379
His Ser Arg His Arg Pro Ala Gly Arg Pro Leu Pro Gly Glu Gly Asn	
40 45 50	
gga cgc ggt cgt ctt cgc cgt agg caa cgc caa gca ggc cgc gca cta	427
Gly Arg Gly Arg Leu Arg Arg Gln Arg Gln Ala Gly Arg Ala Leu	
55 60 65 70	
ctc cac cgc ctt cgg cat gca gct tgt ggc gta ctc cgg acc gga gaa	475
Leu His Arg Leu Arg His Ala Ala Cys Gly Val Leu Arg Thr Gly Glu	
75 80 85	
cgg cag ccg cga gac cgc ttc gta cgt cct cac caa cgg ctc ggc acg	523
Arg Gln Pro Arg Asp Arg Phe Val Arg Pro His Gln Arg Leu Gly Thr	
90 95 100	
ctt cgt cct cac ctc cgt cat caa gcc cgc cac ccc ctg ggg cca ctt	571
Leu Arg Pro His Leu Arg His Gln Ala Arg His Pro Leu Gly Pro Leu	
105 110 115	
cct cgc cga cca tgt ggc cga gca cgg cga cgg cgt cgt cga cct cgc	619
Pro Arg Arg Pro Cys Gly Arg Ala Arg Arg Arg Arg Arg Pro Arg	
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cat cga ggt ccc gga cgc ccg cgc cgc cca cgc gta cgc gat cga gca	667
His Arg Gly Pro Gly Arg Pro Arg Arg Pro Arg Val Arg Asp Arg Ala	
135 140 145 150	
cgg cgc ccg ctc ggt cgc cga gcc gta cga gct gaa gga cga gca cgg	715
Arg Arg Pro Leu Gly Arg Arg Ala Val Arg Ala Glu Gly Arg Ala Arg	
155 160 165	
cac ggt cgt cct cgc cgc gat cgc cac cta cgg caa gac ccg cca cac	763
His Gly Arg Pro Arg Arg Asp Arg His Leu Arg Gln Asp Pro Pro His	
170 175 180	
cct cgt cga ccg gac cgg cta cga cgg ccc cta cct ccc cgg cta cgt	811
Pro Arg Arg Pro Asp Arg Leu Arg Arg Pro Leu Pro Pro Arg Leu Arg	
185 190 195	

ggc cgc cgc ccc gat cgt cga acc gcc cgc cca ccg cac ctt cca ggc 859
 Gly Arg Arg Pro Asp Arg Arg Thr Ala Arg Pro Pro His Leu Pro Gly
 200 205 210

cat cga cca ctg cgt cggt caa cgt cga gct cggt ccg gat gaa cga atg 907
 His Arg Pro Leu Arg Arg Gln Arg Arg Ala Arg Pro Asp Glu Arg Met
 215 220 225 230

ggt cgg ctt cta caa caa ggt cat ggg ctt cac gaa cat gaa gga gtt 955
 Gly Arg Leu Leu Gln Gln Gly His Gly Leu His Glu His Glu Gly Val
 235 240 245

cgt ggg cga cga cat cgc gac cga gta ctc ggc gct gat gtc gaa ggt 1003
 Arg Gly Arg Arg His Arg Asp Arg Val Leu Gly Ala Asp Val Glu Gly
 250 255 260

cgt ggc cga cgg cac gct caa ggt caa gtt ccc gat caa cga gcc cgc 1051
 Arg Gly Arg Arg His Ala Gln Gly Gln Val Pro Asp Gln Arg Ala Arg
 265 270 275

cct cgc caa gaa gaa gtc cca gat cga cga gta cct gga gtt cta cgg 1099
 Pro Arg Gln Glu Glu Val Pro Asp Arg Arg Val Pro Gly Val Leu Arg
 280 285 290

cgg cgc ggg cgt cca gca cat cgc gct gaa cac ggg tga catcgctcgag 1148
 Arg Arg Gly Arg Pro Ala His Arg Ala Glu His Gly
 295 300 305

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35 40 45

Leu Pro Gly Glu Gly Asn Gly Arg Gly Arg Leu Arg Arg Arg Gln Arg
50 55 60

Gln Ala Gly Arg Ala Leu Leu His Arg Leu Arg His Ala Ala Cys Gly
65 70 75 80

Val Leu Arg Thr Gly Glu Arg Gln Pro Arg Asp Arg Phe Val Arg Pro
85 90 95

His Gln Arg Leu Gly Thr Leu Arg Pro His Leu Arg His Gln Ala Arg
100 105 110

His Pro Leu Gly Pro Leu Pro Arg Arg Pro Cys Gly Arg Ala Arg Arg
115 120 125

Arg Arg Arg Arg Pro Arg His Arg Gly Pro Gly Arg Pro Arg Arg Pro
130 135 140

Arg Val Arg Asp Arg Ala Arg Arg Pro Leu Gly Arg Arg Ala Val Arg
145 150 155 160

Ala Glu Gly Arg Ala Arg His Gly Arg Pro Arg Arg Asp Arg His Leu
165 170 175

Arg Gln Asp Pro Pro His Pro Arg Arg Pro Asp Arg Leu Arg Arg Pro
180 185 190

Leu Pro Pro Arg Leu Arg Gly Arg Arg Pro Asp Arg Arg Thr Ala Arg
195 200 205

Pro Pro His Leu Pro Gly His Arg Pro Leu Arg Arg Gln Arg Arg Ala
210 215 220

Arg Pro Asp Glu Arg Met Gly Arg Leu Leu Gln Gln Gly His Gly Leu
225 230 235 240

His Glu His Glu Gly Val Arg Gly Arg Arg His Arg Asp Arg Val Leu
245 250 255

Gly Ala Asp Val Glu Gly Arg Gly Arg Arg His Ala Gln Gly Gln Val

260

265

270

Pro Asp Gln Arg Ala Arg Pro Arg Gln Glu Glu Val Pro Asp Arg Arg
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His Gly
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tca acg gag caa aca aac ttc gtc tct cat gta ccg tca tca ctt tct 96
Ser Thr Glu Gln Thr Asn Phe Val Ser His Val Pro Ser Ser Leu Ser
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ctc cct caa cga cgg acc tct ctc cga gta acc gca gcc agg gcc act 144
Leu Pro Gln Arg Arg Thr Ser Leu Arg Val Thr Ala Ala Arg Ala Thr
35 40 45

ccc aaa ctc tcc aac cgt aaa ctc cgt gtc gcc gtc atc ggt ggt gga 192
Pro Lys Leu Ser Asn Arg Lys Leu Arg Val Ala Val Ile Gly Gly Gly
50 55 60

cca gca ggc ggg gca gct gca gag act cta gca caa gga gga atc gag 240
Pro Ala Gly Gly Ala Ala Ala Glu Thr Leu Ala Gln Gly Gly Ile Glu
65 70 75 80

acg att ctc atc gag cgt aag atg gac aat tgc aag cct tgc ggt ggc 288
Thr Ile Leu Ile Glu Arg Lys Met Asp Asn Cys Lys Pro Cys Gly Gly
85 90 95

gcg att cct ctc tgt atg gtc gga gaa ttc aac ttg ccg ttg gat att 336
Ala Ile Pro Leu Cys Met Val Gly Glu Phe Asn Leu Pro Leu Asp Ile

100

105

110

att gat cgg aga gtg acg aag atg aag atg att tcg ccg tcg aac att 384
 Ile Asp Arg Arg Val Thr Lys Met Lys Met Ile Ser Pro Ser Asn Ile
 115 120 125

gct gtt gat att ggt cgt acg ctt aag gag cat gag tat ata ggt atg 432
 Ala Val Asp Ile Gly Arg Thr Leu Lys Glu His Glu Tyr Ile Gly Met
 130 135 140

gtg aga aga gaa gtt ctt gat gct tat ctg aga gag aga gct gag aag 480
 Val Arg Arg Glu Val Leu Asp Ala Tyr Leu Arg Glu Arg Ala Glu Lys
 145 150 155 160

agt gga gcc act gtg att aac ggt ctc ttc ctt aag atg gat cat ccg 528
 Ser Gly Ala Thr Val Ile Asn Gly Leu Phe Leu Lys Met Asp His Pro
 165 170 175

gag aat tgg gac tcg ccg tac act ttg cat tac act gag tac gat ggt 576
 Glu Asn Trp Asp Ser Pro Tyr Thr Leu His Tyr Thr Glu Tyr Asp Gly
 180 185 190

aaa act gga gct aca ggg acg aag aaa aca atg gag gtt gat gct gtc 624
 Lys Thr Gly Ala Thr Gly Thr Lys Lys Thr Met Glu Val Asp Ala Val
 195 200 205

att gga gct gat gga gct aac tct agg gtt gct aaa tct att gat gct 672
 Ile Gly Ala Asp Gly Ala Asn Ser Arg Val Ala Lys Ser Ile Asp Ala
 210 215 220

ggt gat tac gac tac gca att gca ttt cag gag agg att agg att cct 720
 Gly Asp Tyr Asp Tyr Ala Ile Ala Phe Gln Glu Arg Ile Arg Ile Pro
 225 230 235 240

gat gag aaa atg act tac tat gag gat tta gct gag atg tat gtt gga 768
 Asp Glu Lys Met Thr Tyr Tyr Glu Asp Leu Ala Glu Met Tyr Val Gly
 245 250 255

gat gat gtg tcg ccg gat ttc tat ggt tgg gtg ttc cct aag tgc gac 816
 Asp Asp Val Ser Pro Asp Phe Tyr Gly Trp Val Phe Pro Lys Cys Asp
 260 265 270

cat gta gct gtt gga aca ggt act gtg act cac aaa ggt gac atc aag 864
 His Val Ala Val Gly Thr Gly Thr Val Thr His Lys Gly Asp Ile Lys
 275 280 285

aag ttc cag ctc gcg acc aga aac aga gct aag gac aag att ctt gga 912
 Lys Phe Gln Leu Ala Thr Arg Asn Arg Ala Lys Asp Lys Ile Leu Gly

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305	310	315	320
cca cgt agg ctc tcg aaa cgt gtg gct ctt gta ggt gat gct gca ggg 1008 Pro Arg Arg Leu Ser Lys Arg Val Ala Leu Val Gly Asp Ala Ala Gly			
325	330	335	
tat gtg act aaa tgc tct ggt gaa ggg atc tac ttt gct gct aag agt 1056 Tyr Val Thr Lys Cys Ser Gly Glu Gly Ile Tyr Phe Ala Ala Lys Ser			
340	345	350	
gga aga atg tgt gct gaa gcc att gtc gaa ggt tca cag aat ggt aag 1104 Gly Arg Met Cys Ala Glu Ala Ile Val Glu Gly Ser Gln Asn Gly Lys			
355	360	365	
aag atg att gac gaa ggg gac ttg agg aag tac ttg gag aaa tgg gat 1152 Lys Met Ile Asp Glu Gly Asp Leu Arg Lys Tyr Leu Glu Lys Trp Asp			
370	375	380	
aag aca tac ttg cct acc tac agg gta ctt gat gtg ttg cag aaa gtg 1200 Lys Thr Tyr Leu Pro Thr Tyr Arg Val Leu Asp Val Leu Gln Lys Val			
385	390	395	400
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405	410	415	
gat gag tat gtt cag aag atg aca ttc gat agc tat ctg tac aag cgg 1296 Asp Glu Tyr Val Gln Lys Met Thr Phe Asp Ser Tyr Leu Tyr Lys Arg			
420	425	430	
gtt gcg ccg ggt agt cct ttg gag gat atc aag ttg gct gtg aac acc 1344 Val Ala Pro Gly Ser Pro Leu Glu Asp Ile Lys Leu Ala Val Asn Thr			
435	440	445	
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450	455	460	
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		20					25					30			
Leu	Pro	Gln	Arg	Arg	Thr	Ser	Leu	Arg	Val	Thr	Ala	Ala	Arg	Ala	Thr
	35					40					45				
Pro	Lys	Leu	Ser	Asn	Arg	Lys	Leu	Arg	Val	Ala	Val	Ile	Gly	Gly	Gly
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Pro	Ala	Gly	Gly	Ala	Ala	Ala	Glu	Thr	Leu	Ala	Gln	Gly	Gly	Ile	Glu
	65					70			75			80			
Thr	Ile	Leu	Ile	Glu	Arg	Lys	Met	Asp	Asn	Cys	Lys	Pro	Cys	Gly	Gly
		85					90				95				
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		100				105					110				
Ile	Asp	Arg	Arg	Val	Thr	Lys	Met	Lys	Met	Ile	Ser	Pro	Ser	Asn	Ile
	115					120				125					
Ala	Val	Asp	Ile	Gly	Arg	Thr	Leu	Lys	Glu	His	Tyr	Ile	Gly	Met	
	130				135				140						
Val	Arg	Arg	Glu	Val	Leu	Asp	Ala	Tyr	Leu	Arg	Glu	Arg	Ala	Glu	Lys
	145				150				155			160			
Ser	Gly	Ala	Thr	Val	Ile	Asn	Gly	Leu	Phe	Leu	Lys	Met	Asp	His	Pro
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Lys	Thr	Gly	Ala	Thr	Gly	Thr	Lys	Lys	Thr	Met	Glu	Val	Asp	Ala	Val
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Gly Asp Tyr Asp Tyr Ala Ile Ala Phe Gln Glu Arg Ile Arg Ile Pro
225 230 235 240

Asp Glu Lys Met Thr Tyr Tyr Glu Asp Leu Ala Glu Met Tyr Val Gly
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Asp Asp Val Ser Pro Asp Phe Tyr Gly Trp Val Phe Pro Lys Cys Asp
260 265 270

His Val Ala Val Gly Thr Gly Thr Val Thr His Lys Gly Asp Ile Lys
275 280 285

Lys Phe Gln Leu Ala Thr Arg Asn Arg Ala Lys Asp Lys Ile Leu Gly
290 295 300

Gly Lys Ile Ile Arg Val Glu Ala His Pro Ile Pro Glu His Pro Arg
305 310 315 320

Pro Arg Arg Leu Ser Lys Arg Val Ala Leu Val Gly Asp Ala Ala Gly
325 330 335

Tyr Val Thr Lys Cys Ser Gly Glu Gly Ile Tyr Phe Ala Ala Lys Ser
340 345 350

Gly Arg Met Cys Ala Glu Ala Ile Val Glu Gly Ser Gln Asn Gly Lys
355 360 365

Lys Met Ile Asp Glu Gly Asp Leu Arg Lys Tyr Leu Glu Lys Trp Asp
370 375 380

Lys Thr Tyr Leu Pro Thr Tyr Arg Val Leu Asp Val Leu Gln Lys Val
385 390 395 400

Phe Tyr Arg Ser Asn Pro Ala Arg Glu Ala Phe Val Glu Met Cys Asn
405 410 415

Asp Glu Tyr Val Gln Lys Met Thr Phe Asp Ser Tyr Leu Tyr Lys Arg
420 425 430

Val Ala Pro Gly Ser Pro Leu Glu Asp Ile Lys Leu Ala Val Asn Thr
435 440 445

Ile Gly Ser Leu Val Arg Ala Asn Ala Leu Arg Arg Glu Ile Glu Lys
450 455 460

Leu Ser Val
465